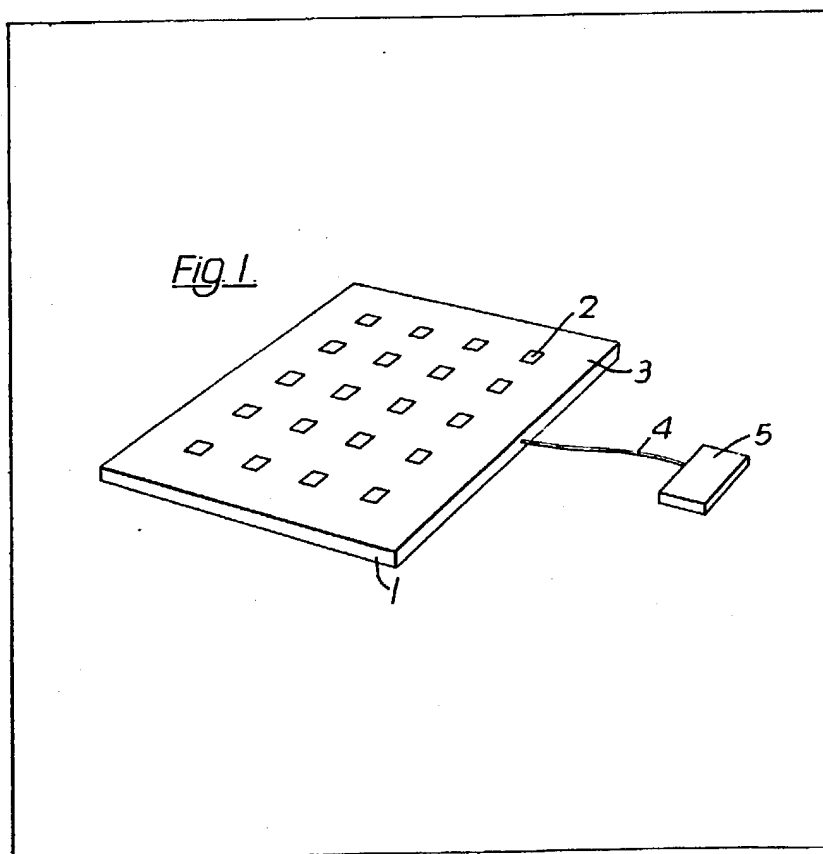


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GB 1292117
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(57) A plurality of pressure sensitive switches are provided in a square array on a platform. A person dancing on the platform can actuate the switches. The switches control a tone generator so a person dancing on the platform can make a tune.



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Fig. 1.

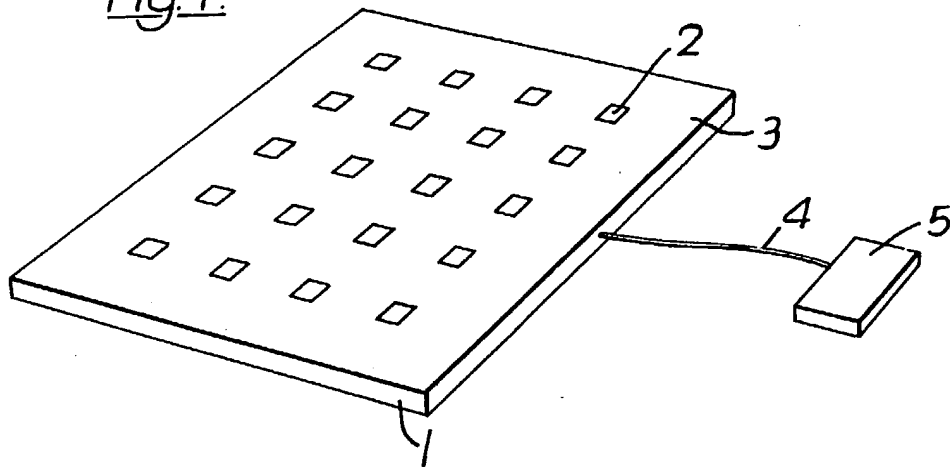
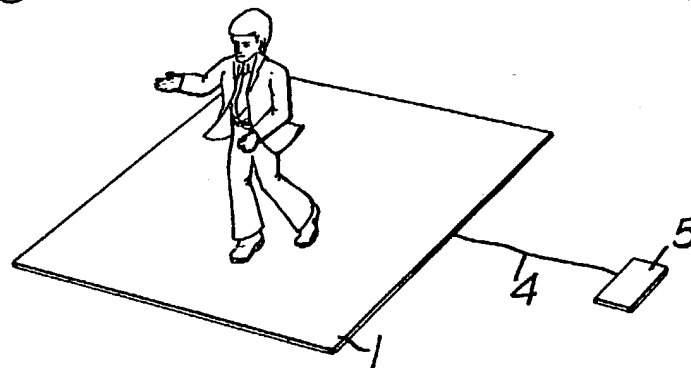


Fig. 2.



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Fig.3.

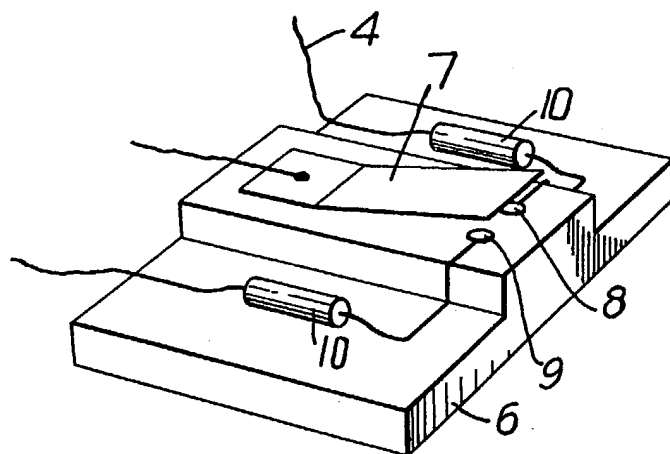


Fig.4

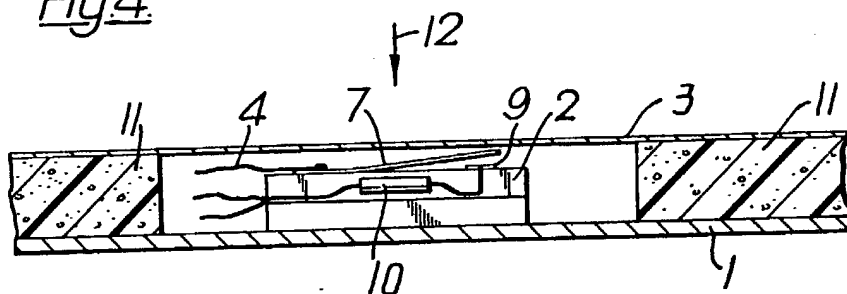
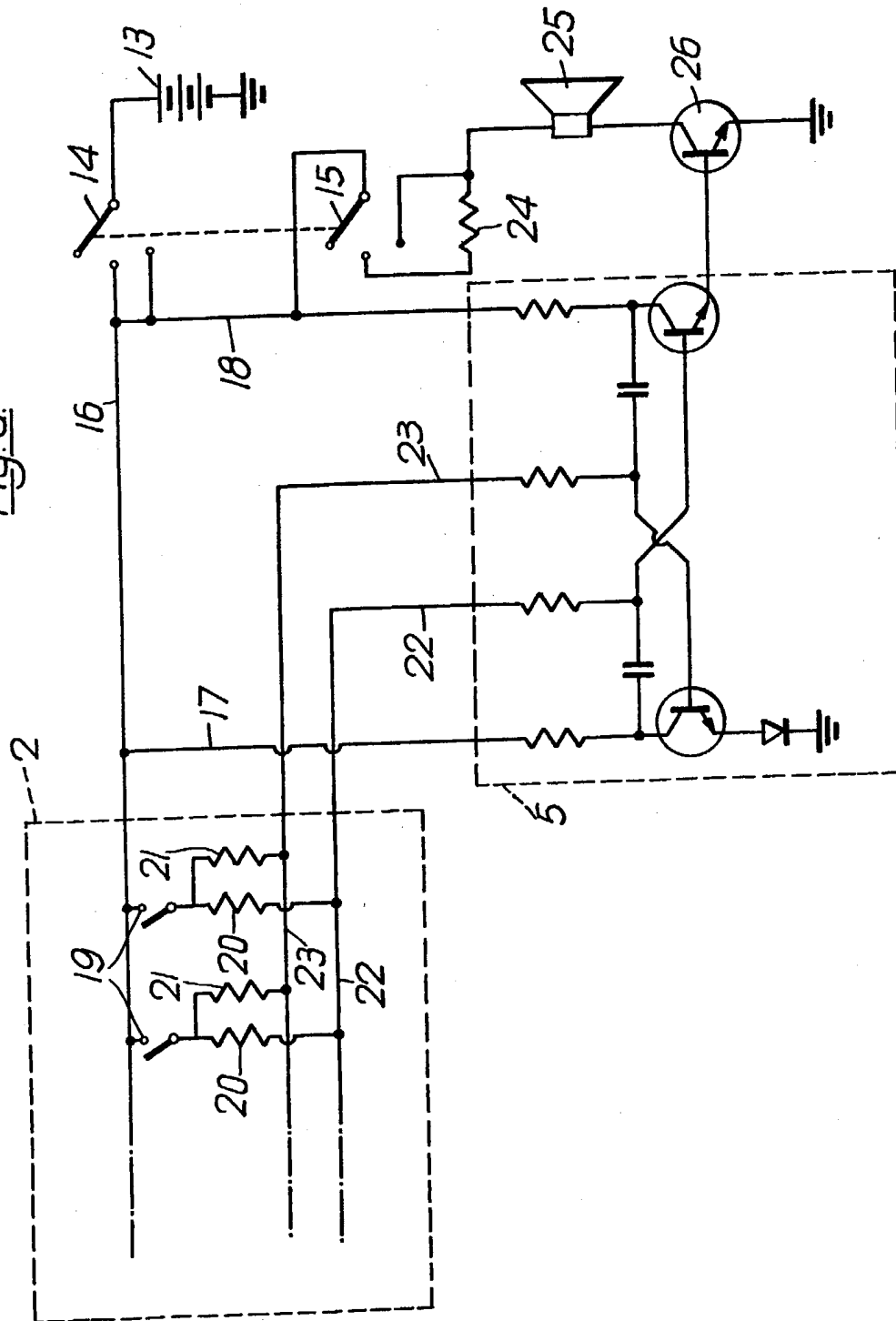


Fig. 5.



SPECIFICATION

Improvements in or relating to a toy, novelty or plaything.

- 5 This invention relates to items which can be termed toys, novelties or playthings, and in particular the invention relates to an item which, in use, can emit a noise.
- 10 According to one aspect of this invention there is provided an item constituting a toy, novelty or plaything and comprising a support member and a tone generator, there being a plurality of pressure sensitive switches located in a two-dimensional
- 15 array in or on said support member, the pressure sensitive member being connected to control the tone generator so that operation of different respective switches causes the generator to emit sounds with different respective characteristics.
- 20 Preferably the pressure sensitive switches are connected to control the generator in such a way that operation of different respective switches causes the generator to emit sounds with different respective frequencies. However, the pressure sensitive switches may be connected to the tone
- 25 generator so that operation of different respective switches causes the tone generator to emit sounds of different volume. In one embodiment of the invention the respective switches may control the
- 30 tone generator so that on operation of switches selected from one predetermined group of switches the tone generator will emit sounds having the same frequency but different respective volumes, whilst on operating switches of another group of
- 35 switches the tone generator will emit sounds having different frequency again with different respective volumes.
- Preferably the support member comprises a flat base sheet and a further flat sheet which sandwiches a plurality of pressure sensitive switches.
- 40 Any number of switches may be provided, the switches being located in any convenient two-dimensional array, such as, for example, a square array.
- 45 Any convenient type of switch may be utilised, but it is preferred to utilise a switch which comprises a spring contact which may be moved, when pressure is applied, into contact with a fixed contact. Preferably each switch comprises two fixed
- 50 contacts, the spring contact completing a circuit between the two fixed contacts when pressure is applied. Conveniently wires are connected to each of said two fixed contacts and a further wire is connected to said spring contact.
- 55 Preferably the switch is located between the two sheets described above, the upper sheet having some resilience to enable the sheet to move sufficiently to cause the spring contacts to move when a pressure is applied to the upper sheet. The sheets,
- 60 where not separated by the switches, may be separated by blocks or members of appropriate material, such as substantially rigid foam plastics material or even a more rigid material, such as wood.
- In one embodiment of the invention operation of
- 65 each switch completes a resistive path which is

connected to a tone generator to control the frequency of the tone emitted by the tone generator.

The tone generator may be of any convenient type, but it is preferred to use a free-running multi-vibrator.

Preferably an amplitude controlling switch is provided to control the overall amplitude of the output of the tone generator.

It will be appreciated that an apparatus in accordance with the invention may be actuated by a person walking, jumping or dancing on the pressure sensitive switches on the support member, and if the person dances in an appropriate way, operating the switches in an appropriate order, the tone generator will emit a tune, and in one particular embodiment of the invention will emit a tune, the notes of which have a different volume.

In order that the invention may be more readily understood, and so that further features thereof may be appreciated, the invention will now be described by way of example with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a perspective view of one embodiment of the invention;

90 Figure 2 is a schematic drawing illustrating a person dancing on the embodiment of the invention illustrated in Figure 1;

Figure 3 is a perspective view of a switch which may be used in an embodiment of the invention;

95 Figure 4 is a sectional view of part of the support member illustrated in Figure 1 showing a switch as illustrated in Figure 4 in position; and

Figure 5 is a circuit diagram of one electrical arrangement that may be used in an embodiment

100 of the invention.

Turning now to the drawings, Figure 1 illustrates a support member 1, which may be formed of wood, chipboard or other substantially rigid material, the support member supporting a plurality of pressure sensitive switches 2 which are disposed in a two-dimension array, the array being a regular square array in the embodiment illustrated in the drawings. A second sheet of material 3, which is a slightly resilient material such as, for example, hardboard or plywood is spaced from the support member 1, and together with the support member, sandwiches the switches 2. The pressure sensitive switches 2 are connected, by appropriate wires or cables 4, to a tone generator 5.

115 It is envisaged that the support member 1 and second member 3 sandwiching the switches may be designed so that a person may dance on the second member, the weight of the person deforming the second member sufficiently to actuate the

120 pressure sensitive switches 2.

The switches 2 are connected to the tone generator 5 in such a way that, actuation of a switch will cause the tone generator 5 to emit a tone. In the embodiment of the invention which is presently

125 being described actuation of the different switches 2 will cause the tone generator to emit different respective tones 5. However, in alternative embodiments of the invention actuation of the different switches 2 will cause the tone generator 5 to emit

130 tones of different amplitude or volume, and in yet a

further embodiment of the invention actuation of switches 2 of one group may cause the tone generator 5 to emit tones of one frequency and different respective amplitudes or volumes, and actuation of switches 2 constituting another group may cause the tone generator 5 to emit tones of a second frequency but again of different respective volumes or amplitudes. A plurality of such groups of switches 2 may be provided, thus enabling a large number of notes with a large number of different amplitudes to be generated by the tone generator.

Any satisfactory pressure sensitive switch may be utilised, but one preferred switch is illustrated in Figures 3 and 4 of the accompanying drawings. The preferred switch comprises a substantially rigid base 6. A leaf spring 7 is attached to the base at one end thereof, the free end of the spring being biased upwardly away from the base. Two electrical contacts 8, 9 are located on the base underneath the free end of the leaf spring 7 and thus, when the leaf spring is deflected downwardly, the leaf spring 7 touches the two electrical contacts 8, 9 and completes an electrical circuit between the contacts 8, 9. The leaf spring 7 itself acts as a contact and has a wire connected thereto, and hence closure of the switch brings three otherwise isolated points into electrical contact. In the particular embodiment illustrated in the accompanying drawings an electrical lead is connected to each of the contacts 8, 9 via a resistor 10 which is mounted on an appropriate part of the base.

Figure 4 of the accompanying drawings illustrates a switch 2, as described above, when in position between the support member 1 and the second member 3. The support member and the second member sandwich the switch 2, and the blocks 11 of substantially rigid foam plastics material are located between the base member and the second member, although these blocks 11 of material may be replaced by blocks of wood or blocks of other appropriate material. The blocks serve to maintain the two members in spaced parallelism, but the arrangement is such that when a direct pressure is applied to the second member as indicated by the arrow 12, the second member will bend or deform, thus forcing the leaf spring downwards to touch the two electrical contacts.

Figure 5 is a circuit diagram of the apparatus illustrated and described above. A battery 13 or other source of D.C. electricity, such as a transformer and diode arrangement provided to enable the apparatus to be run on the main electricity supply, is connected to one switch 14 of a pair 14, 15 of ganged three-position switches. In one position of this first switch 14 the apparatus is off, this being a position illustrated, and in the remaining two positions illustrating a main busbar 16 is connected to the battery. The main busbar 16 is connected via two leads 17, 18, directly to a tone generator 5, which in the illustrated embodiment of the invention is a free-running multivibrator. The main busbar 16 is also connected to a plurality of contacts 19, these contacts being in the above described embodiment of the invention, the leaf spring members of the pressure sensitive switches 2. The

contacts 19 each form part of a pressure sensitive switch, and when each switch is closed the busbar is connected, by two resistors 20, 21 in parallel, to two further leads 22, 23 which are each connected to the free-running multivibrator 5. Thus, by closing selected switches 2, the resistive load applied to the multivibrator can be varied, thus altering the time constant of the multivibrator and consequently altering the tone generated by the tone generator 5. Whilst the accompanying drawing only illustrates two switches 2 and the associated resistors it is to be appreciated that a large number of such switches may be provided, the switches being disposed in the regular array listed above.

The second switch 15 of the ganged three-position switches have an input connected directly to the main busbar 16. The first output terminal is not connected to the rest of the circuit, the movable contact of the switch touching this terminal when the three position switch is in the "off" position. The second contact of the switch is connected via a resistor 24, to a loud speaker 25 and amplifying power transistor 26, the base of the amplifying power transistor being connected to the output of the free running multivibrator constituting the tone generator 5. The third contact of the second switch is connected directly to the loudspeaker 25 and power transistor 26 arrangement. Thus, when the switch is in the second position the resistor will restrict the current that can flow through the power transistor, and thus the loudspeaker, consequently modulating the amplitude of the output sound. However, when the switch is in the third position this modulating effect is not provided. Consequently the three-position switch can be used to place the apparatus in an "off" condition, a "low-volume" condition or a "high-volume" condition.

It will be appreciated that in the described embodiment of the invention the tone generator will only generate one tone at a time regardless of the number of pressure sensitive switches that are actuated. However, it is to be appreciated that in alternative embodiments of the invention a tone generator of a different type may be utilised, and then actuation of any of the pressure sensitive switches will cause the tone generator to generate a respective tone, and thus by pressing two or more of the pressure sensitive switches at one time the tone generator will generate simultaneously two or more different notes.

CLAIMS

1. An item constituting a toy, novelty or plaything and comprising a support member and a tone generator, there being a plurality of pressure sensitive switches located in a two-dimensional array in or on said support member, the pressure sensitive member being connected to control the tone generator so that operation of different respective switches causes the generator to emit sounds with different respective characteristics.

2. An item according to claim 1 wherein the pressure sensitive switches are connected to control the generator in such a way that operation of different respective switches causes the generator

to emit sounds with different respective frequencies.

3. An item according to claim 1 wherein the pressure sensitive switches are connected to the tone generator so that operation of different respective switches causes the tone generator to emit sounds of different volume.

4. An item according to claim 1 wherein the respective switches control the tone generator so that on operation of switches selected from one predetermined group of switches the tone generator will emit sounds having the same frequency but different respective volumes, whilst an operating switches of another group of switches the tone generator will emit sounds having different frequency again with different respective volumes.

5. An item according to any one of the preceding claims wherein the support member comprises a flat base sheet and a further flat sheet which sandwiches a plurality of pressure sensitive switches.

6. An item according to any one of the preceding claims wherein the switches are located in a square array.

7. An item according to any one of the preceding claims wherein each switch comprises a spring contact which may be moved, when pressure is applied, into contact with a fixed contact.

8. An item according to claim 7 wherein each switch comprises two fixed contacts, the spring contact completing a circuit between the two fixed contacts when pressure is applied.

9. An item according to claim 8 wherein the wires are connected to each of said two fixed contacts and a further wire is connected to said spring contacts.

10. An item according to claim 5 or 7 or any claim dependant thereon wherein each switch is located between the said two sheets, the upper sheet having some resilience to enable the sheet to move sufficiently to cause the spring contacts to move when a pressure is applied to the upper sheet.

11. An item according to claim 10 wherein the sheets, where not separated by the switches, are separated by blocks or members of appropriate material.

12. An item constituting a toy, novelty or plaything substantially as herein described with reference to and as shown in the accompanying drawings.

13. Any novel feature or combination of features described herein.